REMARKS

Proposed drawing corrections to Figs. 30 and 29 to show the maximum height h of the edge of the locking projection from the bearing surface of the head being equal to or less than P/n and the total area of the planar portions PP of the bearing surface 303 being larger than the total of planar projected areas PPA of the locking projections 304 are being submitted concurrently.

The specification is amended above to describe these in conjunction with the showing in original Figs. 29 and 30, which confirm that no new matter is involved.

The formerly-claimed machine screw that distinguishes the claimed invention from the Giannuzzi and Olsen patents is deleted in claim 17 in favor of the original description of the same on page 27 of the specification. Because the same limitation is retained in claim 17, albeit in different words, this change is permitted now, after the final Action.

The present invention is related to "a machine-screw". The Examiner states that "a machine-screw" is new matter. Therefore, the term "a machine-screw" needs to be expressed in another way supported by the specification. "A machine-screw" can be defined as a part which has an external thread and the external thread if formed so as to mate with an internal thread already formed in a member to be mated (for example, the member C in Fig. 30).

This feature is described, for example, in page 27, original lines 25-37 of the specification as

> Fig. 30 shows two plates B and C fastened together with the self-locking bolt 310 shown in Fig. 21. The plate B is provided with a through hole of a diameter greater than the major diameter of the external thread of the self-locking bolt 31 and the plate C is provided with threaded hole having an internal thread formed by tapping and mating with the external thread of the self-locking bolt 310. The bolt is passed through the through hole of the plate B and is screwed in the threaded hole of the plate C to fasten the plates B and C together. In the state shown in Fig. 30, the edges 306 of the locking projections 306 formed on the bearing surface 303 are in contact with the upper surface of the plate B.

Giannuzzi ('418) is related to a type of tapping-screw but not to a type of machine-screw. The screw in the present invention is a machine-screw.

As to Olsen ('757), the Examiner stated that the external thread of Olsen is considered a machine-screw, but this is not correct. By comparing Fig. 1 and Fig. 2 in Olsen, it is clear that the external thread of Olsen is a type of tapping-screw and not a type of machine-screw. Further, in Olsen, the recess together with the projection is continuously formed in the undersurface of the head. On the other hand, only recess is formed on the undersurface of the head.

Further, neither in Giannuzzi nor in Olsen, is there any direct disclosure of the characteristic features of the present invention, such as "the maximum height of the edge of the locking projection form the bearing surface of the head is nearly equal t and less than P/n".

Claim18 retains the machine screw limitation on the basis of the original description on page 27 of the specification that is amended above on the basis of the definition and illustration of machine screws attached from McGraw-Hill Dictionary of Scientific and Technical Terms, Fifth Edition, p. 1186.

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Claim 23 adopts the description of original page 27 of the specification to maintain the prior restriction to a machine screw and makes this limitation even more definite in Jepson or improvement form so as to exclude application of the Giannuzzi and Olsen patents affirmatively.

Reconsideration and allowance are, therefore, requested.

Respectfully submitted,

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As shown in Fig. 29, the width of the inclined surface of the locking projection 304 decreases with the increase of the height. Although dependent on the size of the bolt, an angle α in Fig. 29 is in the range of about 6° to about 12°. Fig. 29 also shows that the total area of the planar portions PP is larger than the total planar projected area (the sum of shaded areas PA) of the locking projections 304.

Figs. 21, 29 and 30 shows two plates B and C fastened together with the self-locking bolt 310 ~~shown in Fig. 21~~ to show that the bolt is, by definition as well as appearance, a machine screw. The plate B is provided with a through hole of a diameter greater than the major diameter of the external thread of the self-locking bolt 310 and the plate C is provided with threaded hole having an internal thread formed by tapping and mating with the external thread of the self-locking bolt 310. The bolt is passed through the hole of the plate B and is screwed in the threaded hole of the plate C to fasten the plates B and C together. In the state shown in Fig. 30, the edges 306 of the number n=3 of locking projections ~~306~~ 304 formed on the bearing surface 303 are in contact with the upper surface of the plate B. The maximum height h of the edges 306 is nearly equal to ~~and~~ or smaller than ~~1/3 of a~~ the pitch P distance by which the self-locking bolt 310 advances when the same is turned by one full turn in the fastening direction, i.e., P/3. As the self-locking bolt 310 is turned further in the fastening direction form the state shown in Fig. 30, the edges 306 of the locking projections 304 sink gradually in the upper surface of the plate B. The self-locking bolt 310 is turned further until fastening torque applied to the self-locking bolt 310 increases to a predetermined value after the locking projections 304 have completely sunken in the upper surface of the plate B and

the bearing surface 303 has come into contact with the upper surface of the plate B.

17. (twice amended) A self-locking bolt having:

a head having a locking function; and

a threaded part extending from the head and provided with an external thread of a pitch P, the external thread being ~~a machine screw~~ such as to mate with an internal thread of a member to be mated;

wherein n locking projections are formed at equal angular intervals on a bearing surface of the head,

the locking projections are separated from one another by planar portions of the bearing surface,

heights of the locking projections from the bearing surface increase gradually in a direction opposite a fastening direction in which the head is rotated for fastening to maximum heights,

there are edges at the maximum heights,

the heights of the locking projections decrease steeply from the edges in the direction opposite the fastening direction,

the maximum heights of the edges are equal to or less than P/n, and

a total area of the planar portions is larger than a total planar projected area of the locking projections.

23. (twice amended) ~~A~~ In a self-locking bolt for mating in a threaded hole comprising:

a head having a bearing surface; and

a threaded part extending from the bearing surface and provided with ~~a machine screw~~ an external thread of a pitch P for ~~fastening to a first member~~ the mating in the threaded hole when the head and threaded part are rotated in a fastening direction, the improvements wherein:

~~wherein~~ there are n locking recesses at equal angular intervals about the bearing surface, spaced from one another by planar portions;

~~wherein~~ depths of the locking recesses from the bearing surface decrease gradually in a direction opposite the fastening direction from maximum depths to minimum depths with edges of the locking recesses at junctions of the bearing surface and end walls of the locking recesses at the maximum depths of the locking recesses for bulging into the locking recesses protrusions of a second member that is between the bearing surface and the first member when the head and threaded part are rotated in the fastening direction;~~,~~ and

~~wherein~~ a total area of the planar portions is larger than a total planar projected area of the locking projections.